Blood Pressure and Social Class in a Jamaican Community

WILLIAM W. DRESSLER, PHD, GERALD A.C. GRELL, FRCP, PHILIP N. GALLAGHER, MS, AND FERNANDO E. VITERI, MD, SCD

Abstract: A study of social factors and blood pressure was conducted in a Jamaican community among a sample of 199 persons ages 30 to 50. After controlling for obesity, age, and respondent tension (and other covariates), interaction effects of social class × sex for systolic and diastolic blood pressure were found. Blood pressure increased with increasing social class for males and decreased with increasing social class for females. (*Am J Public Health* 1988; 78:714–716.)

Introduction

Among environmental variables, social factors may be important determinants of elevations in arterial blood pressure, and hence in the etiology of essential hypertension.[1,2] In northern industrial societies, higher social class, assessed either as occupational status or degree of educational achievement, is consistently related to lower average blood pressure and/or rates of essential hypertension.[3–10]

The relation of social class and blood pressure shows a less consistent pattern in studies of developing societies. Ashcroft, *et al*,[11] found average blood pressures and rates of hypertension to be elevated in higher status occupational groups in Guyana, as did Caamano, *et al*, in Mexico[12] and Srivastana, *et al*, in India.[13] Ribeiro, *et al*, in Brazil found rates of hypertension to be elevated among white collar versus blue collar workers.[14] Hutchinson found higher blood pressures among males with more education, but lower blood pressures among females with more education in St. Vincent, West Indies.[15] On the other hand, Abengowe, *et al*,[16] and Weitz[17] found higher blood pressure in lower occupational status groups in Nigeria and Nepal, respectively. Although not all of these studies employed appropriate controls or statistical methods, these results suggest that the social and cultural context of a developing society may alter the effects of social class on blood pressure. If in fact the relationship between social class and blood pressure changes with level of economic development, this may offer an important clue to the etiology of hypertension. The present paper examines this relation within a community in Jamaica.

Methods

An epidemiologic survey of a community of approximately 3,000 persons on the fringe of the Kingston, Jamaica metropolitan area was undertaken in 1984 as part of a larger international cooperative study. Traditionally this was a community of peasant cultivators who worked small plots of land in the surrounding hills, but it is becoming an attractive community for upper-status persons seeking respite from the larger city; thus, it is the process of assuming a somewhat "suburban" character.

Persons ages 30 to 50 were sampled, following previous recommendations.[18] All respondents were ethnically Afro-Caribbean. Nurse-interviewers visited each house in the community and interviewed a maximum of two individuals within the household who were within the target age range. This procedure resulted in a sample of 199 persons: 73 males and 126 females. Nine blood pressure measurements were taken, and the dependent variables in all analyses are the averages of these nine readings. At each interview, respondents' weights were measured with portable scales, and heights were recorded.

Social class was operationalized as the occupational status of the head of the household in which a respondent lived,[19] using a ranking of the prestige status of occupations developed and validated for Jamaica.[20] This six-point ranking was collapsed to three social class groups. Lower class refers to persons employed in unskilled (e.g., farm laborers, domestic workers) or semi-skilled (e.g., factory workers, porters) occupations. Emergent middle class refers to persons employed in skilled occupations, such as police, carpenters, machine operators, and farmers operating larger farms. Middle/upper class refers to highly skilled, managerial, and professional occupations.

Situational factors included as potential covariates were: time of day (morning = 0; afternoon = 1) time of year of the interview (Jan/Feb = 0; other = 1), interviewer's rating of the respondent's level of tension during the interview (0 = relaxed; 1 = tense), respondent's self-reported average level of physical activity (low = 0; high = 1), and addition of salt to food at the table (0 = not added; 1 = added). Consumption of high fat foods was assessed by asking each respondent how many times per week a list of 18 high fat food items were consumed[21]; scores were derived by averaging the ratings over the 18 items. The Quetelet Index body mass, age in years, and sex were also included in a regression.

Results and Discussion

Descriptive statistics for the entire sample, and for males and females separately, are shown in Table 1. Average blood pressures by social class for males and females are shown in Table 2. For males, higher social class is associated with higher blood pressures; for females, higher social class is associated with lower blood pressure. This interaction effect was tested again in multiple regression analyses, in which blood pressures were simultaneously adjusted for covariates, main effects, and interaction effects, shown in Table 3. Social class was coded as two dummy variables (dropping the lower class category) and sex × social class interactions were included as cross-products. The partial regression coefficients for both social class × sex interaction terms are more than twice their standard errors for both systolic and diastolic blood pressure. Blood pressures by social class and sex, adjusted for covariates, are shown in Table 4. Results were unchanged when persons reporting use of anti-hypertensive treatments (n = 28) were deleted from the analysis.

These interaction effects are not due to differential treatment status, situational factors, or dietary behaviors,

Address reprint requests to William W. Dressler, PhD, Associate Professor, Department of Behavioral Science, University of Alabama, Box 6291, Tuscaloosa, AL 35487. Dr. Grell is with the Department of Medicine, University of the West Indies; Mr. Gallagher is with the Department of Epidemiology, University of North Carolina, Dr. Viteri is with the Department of Nutritional Sciences, University of California, Berkeley. This paper, submitted to the Journal August 11, 1987, was revised and accepted for publication December 8, 1987.

TABLE 1—Descriptive Statistics

	Total Sample (n = 199)	Males	Females
Systolic blood pressure	121.1(±17.3)	123.3(±17.0)	119.8(±17.4)
Diastolic blood pressure	81.7(±12.9)	83.3(±12.9)	80.8(±12.8)
% Hypertensive (WHO criteria)[a]	16.1	17.8	15.1
% Hypertensive (HDFP criteria)[b]	20.1	20.5	19.8
% Elevated blood pressure (HANES criteria)[c]	25.4	27.8	24.0
Age	38.5(±6.1)	38.0(±6.2)	38.8(±6.1)
Sex			
Males (%)	36.7	—	—
Females	63.3	—	—
Social class			
Lower class (%)	26.6	20.5	30.1
Emergent-middle (%)	47.2	54.8	42.9
Middle/upper class (%)	26.1	24.7	27.0
Body mass index	3.37(±0.63)	3.21(±0.57)	3.46(±0.65)
Physical activity			
Low (%)	55.3	52.1	57.1
High (%)	44.7	47.9	42.9
Respondent tension			
Relaxed (%)	90.0	89.1	90.5
Tense (%)	10.0	10.9	9.5
Interview time of day			
Morning (%)	59.3	64.4	56.3
Afternoon (%)	40.7	35.6	43.7
Month of interview (%)			
January/February	38.2	32.8	41.2
Other	61.8	67.2	58.8
Salt intake			
Not added at table (%)	61.9	69.9	57.2
Added at table (%)	38.1	30.1	42.8
Fat intake	3.34(±0.75)	3.17(±0.79)	3.43(±0.72)
Taking treatment (%)	14.1	8.2	17.5

[a]World Health Organization criteria = systolic ≥160 mm Hg and/or diastolic ≥95 mm Hg.
[b]Hypertension Detection and Follow-up Program criteria = diastolic ≥95 mm Hg and/or reported use of anti-hypertensive medication.
[c]US Health and Nutrition Examination survey criteria = systolic ≥140 mm Hg and/or diastolic ≥90 mm Hg.

TABLE 2—Average (± standard deviation) Blood Pressure by Social Class and Sex

Sex/Social Class	Systolic	Diastolic
Males		
Lower class (n = 15)	113.6 (±13.6)	76.4 (± 9.8)
Emergent-middle class (n = 40)	124.6 (±18.1)	85.1 (±14.2)
Middle/upper class (n = 18)	128.3 (±14.2)	84.9 (±10.5)
Females		
Lower class (n = 38)	125.5 (±17.8)	83.6 (±12.3)
Emergent-middle class (n = 54)	118.7 (±17.5)	80.8 (±13.0)
Middle/upper class (n = 34)	115.4 (±15.4)	77.8 (±12.8)

although the measurement of the latter was admittedly crude. We collected no data on alcohol assumption, a probable blood pressure correlate.[22] However, in Jamaica, heavy drinking is concentrated in lower class groups for both males and females, making this an unlikely confounder.[23]

It is unlikely that sampling variability has a major effect on the results. According to census figures, the sample obtained here probably underrepresents males, as do many field studies; however, there are no significant sex differences in the social class distribution in this sample; hence males are probably not selectively misrepresented in particular class categories, so that any underrepresentation will not contribute to the observed interaction effects.

This leaves sociocultural factors associated with social

TABLE 3—Multiple Regression of Systolic and Diastolic Blood Pressure

	Systolic BP		Diastolic BP	
Variable	Regression Coefficient	Standard Error	Regression Coefficient	Standard Error
Age	0.77	0.19	0.54	0.14
Body Mass Index	5.51	1.86	3.91	1.42
Respondent tension	7.19	3.87	4.72	2.96
Physical activity	2.64	2.45	0.92	1.88
Time of interview	−2.92	2.37	−0.74	1.82
Month of interview	3.90	2.47	1.14	1.89
Salt use	−1.31	2.41	−1.08	1.84
Fat intake	−1.18	1.58	−0.82	1.21
Sex	−8.77	4.92	−5.14	3.76
Social Class				
Emergent-middle	−6.87	3.89	−2.89	2.59
Middle/upper	−6.09	3.89	−3.36	2.98
Interaction Effects				
Sex × emergent-middle	16.86	5.85	10.99	4.47
Sex × middle/upper	20.08	6.77	11.18	5.18
Intercept	77.84	10.68	50.47	8.17
Multiple R^2	.22		.18	

TABLE 4—Adjusted Systolic and Diastolic Blood Pressure by Social Class and Sex (adjusted for covariates shown in Table 3)

Sex/Social Class	Systolic	Diastolic
Males		
Lower class (n = 15)	116.57	77.48
Emergent-middle class (n = 40)	126.56	85.58
Middle/upper class (n = 18)	130.56	85.30
Females		
Lower class (n = 38)	125.35	82.62
Emergent-middle class (n = 54)	118.48	79.73
Middle/upper class (n = 34)	119.26	79.25

class as likely variables more directly related to blood pressure. Possible variables include psychosocial stressors associated with social class such as lifestyle stress[24] or occupational stressors.[14] Increasing social class may lead to a more stable social support system for women,[25] while compromising the time available for men to engage in supportive relationships.[26] These results point to the need to examine blood pressure correlates across different cultures.

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WHO Studies Neuropsychological Aspects of HIV Infection

Important neurological and psychiatric clinical conditions have been recognized as occurring in persons with AIDS or in those ill with the AIDS-related complex. In some cases, these conditions have been linked to effects of the AIDS virus (human immunodeficiency virus—HIV Type I) in the brain and nervous system. As a result, concern has been expressed about whether persons infected with HIV who are otherwise healthy might experience difficulties in neuropsychological function.

A four-day consultation was convened in Geneva March 14–17, by the WHO Global Program on AIDS (GPA) and the WHO Mental Health Program (MNH) to examine currently available scientific and medical data on the neuropsychological effects of HIV infection, with particular attention to HIV-infected but otherwise healthy individuals. In order to review the broad range of issues involved, 48 experts from 17 countries attended this meeting, representing the disciplines of neurology, psychiatry, psychology, neurobiology, epidemiology, social work, occupational health, ethics, clinical research, and health policy.

"At present, there is no evidence for an increase of clinically significant neuropsychological abnormalities in HIV-infected people who are healthy," said Dr. Jonathan Mann, Director of GPA. "Therefore, there is no justification for HIV screening as a strategy for detecting functional impairment in asymptomatic persons. Furthermore, there is no evidence that HIV screening of healthy persons would be useful in predicting the onset of functional impairment in person who remain otherwise healthy."

Dr. Mann said that the most important outcome of these deliberations is that governments, employers, and the public can be assured that based on the weight of available scientific evidence, otherwise healthy HIV-infected individuals are no more likely to be functionally impaired than uninfected persons.

Dr. Norman Sartorius, Director of the Mental Health Program, said these recommendations will be kept under continual review as additional scientific information becomes available. He noted that the meeting also made a series of recommendations regarding the need for and types of future research. Dr. Sartorius said the consultation noted the frequency of occurrence of neuropsychiatric conditions in clinically ill patients (i.e., those with AIDS-related complex and AIDS) and made proposals concerning services required to deal with this problem. A complete report from the consultation was to be available from WHO by the end of April.